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ABSTRACT

This project, sponsored by the Jim and Ada Irving Foundation, was keyed to determining the most significant free and low-cost teaching aids needed by the nation's classroom science teachers. Some 2,000 grade and high school science teachers throughout the country were polled on a scientifically sample basis from names listed in the U.S. Registry and the elementary school membership of the National Science Teachers Association. Included in the report are the availability and evaluation of business/industry free and inexpensive teaching materials, guides to such materials, and titles of publications considered as "most valuable guides." (Author/CP)

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Science Materials Research Committee

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A REPORT

An Opinion Survey of K - 12 Science Teachers on the Contribution of Business and Industry to Their Classrooms and Laboratories in the Form of Free and Low Cost Materials.

February, 1969

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Research dedicated to the continued improvement of science education in America.

Sponsored by a grant from the Jim and Ada Irving Foundation

R. F. D. 2, Stoughton, Wis. 53589 (608) 873-7766

SE 007 614

Price: One Dollar

PREFACE

SCIENCE MATERIALS RESEARCH COMMITTEE STUDY

Forward

The following information is a complete report of the Science Materials Research Committee.*

The project, sponsored by the Jim and Ada Irving Foundation, was keyed to determining the most significant free and low-cost teaching aids needed by the nation's classroom science teachers.

Some 2,000 grade and high school scientists in education throughout the country were queried on a scientifically sampled basis from names listed in the U. S. Registry and the elementary school membership of the National Science Teachers Association.

Members of the Science Materials Research Committee include scientists in education, science educators, and consultants to science education. All of these people are members of the National Science Teachers Association and formerly served on the association's Committee on Evaluation of Business/Industry Sponsored Teaching Aids.

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SCIENCE TEACHERS' OPINION SURVEY

A Tabular Summary Report *

February 1969

* Compiled and prepared by Nobi Takahashi, Communication Research Center, San Francisco, Calif.

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SCIENCE TEACHERS' OPINION SURVEY

Questionnaire Returns

	#	%
TOTAL RETURNS	523	
. Usable returns	521	100%
*Grade schools	127	24
*High schools	368	71
. Under 500 pupils	65	13
. Over 500 pupils	280	54
. Size not specified	23	4
Colleges	12	2
**Unclassifiable	14	3
. Non-usable returns	2	

---

* Includes a small number of schools with junior high grades (7-8-9)

** These are primarily all-grade schools - from kindergarten through senior high levels.

SUBJECT MATTERS OR COURSES TAUGHT BY THE RESPONDENTS

Group: Grade Schools

Subject or course		No. of replies
. Kindergarten		7
. Other		32
Elementary Science:		
. Traditional subject matter		78
. Elem. School Science Project (USU)		4
. Elem. Science Adv & Res Project..		2
. Am Assn for Adv of Science		17
. Science Curric. Improvement Study		11
. Other		39
Elem. Science Study	(12)	
Concept in science	(2)	
Discovery method	(1)	
Enrichment	(1)	
SRA	(1)	
Grades 7-8:		
. Traditional subject matter		5
. Intermed. Science Curric Study...		1
. Introductory Physical Science ...		3
. Earth Science Curriculum Study..		2
. Other		4
Earth science	(1)	
Life science	(2)	
Biology:		
. Traditional		1
. Biological Science Curric. Study		1

SUBJECT MATTERS OR COURSES TAUGHT BY THE RESPONDENTS

Group: High Schools

Subject or course	No. of replies
. Elementary Science	5
. Grades 7-8-(9):	
. Traditional subject matter	82
. Intermed. Science Curric. Study ..	17
. Introductory Physical Science.....	49
. Earth Science Curric. Project.....	43
. Other	23
General science, 9th gr. (11)	
Life science (4)	
Time, space, matter, 8th gr. (3)	
One mentioning each:	
Astronomy	
Biology	
Academic physical science	
Earth & space science	
Natural science	
Matter & energy, 9th gr.	
NYS Earth Science	
NTS Experimental Syllabus	
. Biology:	
. Traditional	68
. Biological Science Curric. Study	73
- Blue (18)	
- Green (24)	
- Yellow (32)	
. Other (not specified; misc)	20
Special materials (4)	
Advanced biology (3)	
Biology II (3)	
NYS Regents Syllabus (3)	
Physiology (2)	
Patterns & processes (2)	
Science survey (2)	
One mentioning each:	
Geology & conservation	
Physical science for high ability freshmen	
Lab blocks	
Life science	

Subject or course	No. of replies
• Chemistry:	
• Traditional	68
• Chemical bond approach	14
• Chemical education matl study	37
• Other (not specified; misc.)	14
Advanced placemt chem. (3)	
NY State Regents (2)	
One mentioning each:	
NY State chemistry	
Intermediate chemistry	
Nuclear science	
• Physics:	
• Traditional	57
• Harvard Project physics	5
• Physical Science Study Comm.	39
• Eng'rg Concepts Curric. Proj.	1
• Other (not specified)	9
NY State Regent courses (3)	
General science . (2)	
One mentioning each:	
Electronics	
Traditional supplemental with PSSC	
Advanced physics	
Earth & space	
Quantitative physical science	
Geology	
• Agricultural Science	2

SUBJECT MATTERS OR COURSES TAUGHT BY THE RESPONDENTS

Groups: Colleges; Unclass.

Subject or course	No. of replies Coll.	Unclass.
. Nursery Schools	1	1
. Head Start Classes	1	3
. Kindergarten	1	1
. Elementary Science:		
. Traditional subject matter	3	5
. Elem. Sch. Science Project	-	1
. Elem. Sc. Adv. & Res. Proj.	-	1
. Am Assn for Adv of Science	4	1
. Sc. Curric. Improvement Study	4	2
. Other	4	2
ESS (3)		
. Grades 7-8:		
. Traditional subject matter	1	8
. Intermed. Sc. Curric. Study	1	1
. Introductory Physical Science	2	1
. Earth Science Curric. Project	1	1
. Other	1	1
. Biology:		
. Traditional	-	2
. Biological Sc. Curric. Study	-	3
- Blue ( )		
- Green ( )		
- Yellow (3)		
. Other	-	3
NY State Biology (1)		
. Chemistry:		
. Traditional	-	2
. Chemical bond approach	-	-
. Chemical education matl study	-	-
. Other	-	1
NY State Chem (1)		
. Physics:		
. Traditional	-	3
. Harvard Project physics	-	1
. Physical Science Study Comm.	-	1
. Eng'rg Concepts Curric. Proj.	-	-
. Other	-	2
Non-college physics (1)		

Subject or course	No. of replies Coll.	Unclass.
. College Undergraduate:		
. Methods in elem. science	6	-
. Methods in jr. hi. science ...	1	-
. College Graduate:		
. Methods of teaching elem. and jr. high science	5	-
. Science education	1	-

AVAILABILITY OF BUSINESS/INDUSTRY FREE AND INEXPENSIVE TEACHING MATERIALS BY SCIENCE SUBJECT FIELD/COURSE

Group: Grade Schools

Subject or course	Distribution of replies		
	Adequate	Inadequate	Non-existent
. Elementary science:			
General (grade level unspec.)	12	25	5
7th & 8th grade level.....	-	2	1
7th grade	-	1	-
6th grade	-	3	-
5th & 6th grade	-	3	-
5th grade	-	5	1
4th - 5th - 6th grade	-	2	-
4th grade	-	2	-
4th - 8th grade	1	-	-
3rd grade	-	-	1
1st - 6th grade	-	3	-
1st - 3rd grade	-	1	-
Kindergarten	-	1	-
S.C.I.S.	-	1	2
A.A.A.S.....	2	1	2
Pre-school	-	1	1
. Earth science	2	6	1
. Physical science	-	3	-
. Life science	3	3	-
. Elementary physics & chemistry	-	1	2
. Elementary biology	-	1	1
. General geology	1	1	1
. Meterology (weather)	-	3	-
. Magnetisum and electricity	-	2	-
. Atomic energy	1	-	-
. Oceanography	-	1	-
. Astronomy	1	-	-
. Aerospace/space	3	2	-
. Machines	-	1	-
. Concepts in science	1	-	-
. Conservation	2	1	-
. Nature and environment	-	1	-
. Ecology	-	1	-

Subject or course	Adequate	Inadequate	Non-existent
. Natural history	-	1	-
. Microorganism	-	1	-
. Human body	1	-	-
. Food and nutrition	1	-	-
. Television science, gr. 1 - 4	-	1	-
. Health (and development).....	3	1	-

AVAILABILITY OF BUSINESS/INDUSTRY FREE AND INEXPENSIVE TEACHING MATERIALS BY SCIENCE SUBJECT FIELD/COURSE

Group: High Schools

Subject or course	Distribution of replies		
	Adequate	Inadequate	Non-existent
. Biology	39	66	14
. BSCS	2	10	1
. Advanced biology	1	10	-
. Chemistry	36	65	8
. Chemistry (jr. high).....	1	1	1
. Physics	12	50	10
. Physics (jr. high)	2	1	-
. Physical science (PSSC)	4	4	2
. Physical science (jr. high)	9	22	4
. Introductory physical science	4	8	2
. Physical science - quantitat.	-	-	1
. General science (jr. high)..	22	37	6
. Basic science (high school).	1	4	-
. Science survey (jr. high)...	-	1	-
. Senior science	-	1	1
. Earth science	20	30	4
. Life science	8	4	2
. Geology	2	3	1
. Elementary science	3	5	1
. Space science (aerospace)...	1	3	-
. Astronomy (jr. high)	-	2	1
. Lab science/technology.....	-	3	-
. Meterology	1	1	-
. Time, space and matter	-	2	-
. Nutrition/health	-	2	-
. Mathematics	-	1	1
. Harvard Project Physics	1	1	-
. Academic physical science...	1	-	-
. Matter and energy	-	-	1
. Nuclear	1	-	-
. Science problem solving (jr.hi.)	-	1	-
. Horticulture	1	-	-
. Electronics	-	1	-
. NYS Experimental Syllabus...	1	-	-

EVALUATION OF BUSINESS/INDUSTRY CONTRIBUTIONS TO SCIENCE TEACHING

Item	No. of replies	Distribution of replies: Critical need	Useful	Of doubtful use	Of no use
	#	#	#	#	#
1. Booklets	477	59	339	74	5
2. Pictures	485	135	312	38	-
3. Films	490	199	278	12	1
16 mm	(118)	(49)	(69)		
8 mm	(51)	(27)	(24)		
4. Video tapes	397	92	172	78	55
5. Film strips	483	120	316	40	7
6. Transparencies	483	181	268	29	5
7. Audio aids	452	145	248	48	11
8. Books	479	173	282	22	2
9. Kits of science toys	467	158	227	50	32
10. Models	469	181	241	31	16
11. Speakers	472	161	256	50	5
12. Demonstration programs	475	148	251	65	11
13. Library loan items	445	115	267	53	10
14. Classroom project sets	457	164	224	60	9
15. Give-aways	466	127	233	97	9
16. Games, puzzles	471	138	247	66	20
17. TV or radio program	422	109	220	70	23
18. Computer time & instruct.	402	60	131	146	65
19. Non-comml staff in-service education pgorams	412	116	216	66	14
20. Plant or laboratory tours or visits	484	136	290	50	8

Question e - Please evaluate as many of the following itmes as possible in terms of your science teaching interests in them.

EVALUATION OF BUSINESS/INDUSTRY CONTRIBUTIONS TO SCIENCE TEACHING

Items Ranked by 'Critical Need' in Descending Order

Item		% distribution of replies			
		Critical need	Useful	Of doubtful use	Of no use
		%	%	%	%
1. Films	100%	41	57	2	(-)
2. Models	100%	39	51	7	3
3. Transparencies	100%	38	55	6	1
4. Books	100%	36	59	5	(-)
5. Classroom project sets	100%	36	49	13	2
6. Speakers	100%	34	54	11	1
7. Kits of science toys.	100%	34	48	11	7
8. Audio aids	100%	32	55	11	2
9. Demonstration programs	100%	31	53	14	2
10. Games, puzzles	100%	29	53	14	4
11. Plant or laboratory tours or visits....	100%	28	60	10	2
12. Non-comml staff in-service educ prog.	100%	28	53	16	3
13. Pictures	100%	28	64	8	-
14. Give-aways .....,	100%	27	50	21	2
15. Library loan items..	100%	26	60	12	2
16. TV or radio program	100%	26	52	17	5
17. Film strips	100%	25	55	8	2
18. Video tapes	100%	23	43	20	14
19. Computer time & instruction	100%	15	33	36	16
20. Booklets	100%	12	71	16	1

IMPORTANT SUGGESTIONS ON SPECIFIC SCIENCE TEACHING MATERIALS

(Question f)

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IMPORTANT SUGGESTIONS ON SPECIFIC SCIENCE TEACHING MATERIALS

1. Suggested subject matters for films/filmstrips

Subject matter	No. of mentionings: Grade school	No. of mentionings: High school
• Animals/animal parts	2	1
• Animals, one-celled.....	-	1
• Animal behavior	1	-
• Astronomy; galaxies	2	3
• Atmosphere	-	1
• Atomic energy	1	1
• Atomic structure (animated)	1	4
• Bacteria & viruses	-	1
• Basic industries	1	-
• Basic science concepts/principles..	1	2
• Biochemical activities of living things	-	1
• Biochemistry	-	1
• Biology	1	5
• Birth of live-bearing fish	1	-
• Blood circulation	1	-
• Cancer research/cancer effects	-	1
• Careers/opportunities in sciences..	-	2
• Chemistry, importance of; experimental chemistry; chemical compounds and bonding	1	12
• Cell respiration	-	3
• Comparative anatomy	-	1
• Computers	-	1
• Conservation and pollution	1	-
• Contributions of science & industry	-	1
• DNA - RNA	-	2
• Decay constant	-	1
• Density, concept of	-	1
• Desert life	1	-
• Drug industry	-	1
• Earth science	1	2
• Earthquakes, volcanoes	2	4
• Ecology	-	3
• Electricity	2	1
• Engines, motors	-	1
• Energy	1	1
• Evolution	-	2

Subject matter	No. of mentionings: Grade school	High school
. Flames, characteristics of	1	-
. Flowers/flower parts	1	-
. Forces	-	1
. Fractional distillation	-	1
. Genetics - applications to domestics plants and animals	-	2
. Geology, historical	-	1
. Geological timetable (correlated with evolution)	-	1
. Glacier action	1	-
. Gravitation (free falling bodies)...	1	3
. Health - care of teeth, eyes, ears	1	-
. Hearing, anatomy and function of...	-	1
. Heat	1	-
. Heredity	-	1
. Human body/anatomy	2	2
. Industrial systems	-	1
. Insects	1	-
. Kreb's cycle	-	1
. Lab instrumentation	-	3
. Lab safety	-	1
. Lab skill and techniques	-	4
. Landforms, formation of	-	1
. Lasers	-	2
. Light	1	1
. Life science	1	1
. Magnestism	1	1
. Marine biology	-	1
. Matter	1	-
. Marijuana or 'pot'	1	-
. Metric system (weights & measurements)	1	-
. Mechanics for use (physics)	-	3
. Microscope, use of	1	-
. Mineral cycle	1	-
. Mitosis - meiosis	-	5
. Molecular arrangement	-	1
. Molecular biology	-	1
. Molecular movements/orbitals	1	2
. Molecular theory	-	1
. Molecular genetics.....	-	1
. Motion acceleration	-	1
. Motion in heavens	-	1
. Motion of earth	1	-
. Muscle response	1	-

Subject matter	No. of mentionings: Grade school	High school
. NASA projects	-	1
. Nuclear chemistry	-	1
. Nuclear energy	-	1
. Nursing chemistry	-	1
. Optics	-	2
. Plant cells	1	1
. Plant growth/life	2	3
. Photosynthesis (animated)	-	2
. Physics (modern), basic concepts of	-	3
. Physical science	-	2
. Pollinization	1	-
. Pond life	2	-
. Prehistoric animals	1	-
. Prehistoric man	-	1
. Protein synthesis	-	1
. Public health services	1	-
. Quantum atom and theory	-	2
. Radiation	-	1
. Relativistic transformation	-	1
. Rocks and minerals	-	1
. Science and society	1	-
. Science and superstitution	1	-
. Seed germination	1	-
. Sec education (late elem. children)	1	-
. Solar energy	1	-
. Sound	2	1
. Space/space science	1	1
. Space craft/machinery/rockets	-	1
. Space travel/manned space	1	1
. Study of man	1	-
. Temperature (vs solubility)	-	2
. Tropical fish and acquaria	1	-
. Tropism	-	1
. Vapor pressure	-	1
. Venereal diseases - LSD, STP, etc	-	1
. Wave motion	-	1
. Water/water cycle	2	-
. Weather/weather fronts	2	2
Cloud identification	-	1
Seasons	1	-

2. Suggested subject matters for booklets and pamphlets

(Note: Most of the subject matters listed below received only one mentioning each; none had more than two mentionings)

- Animal and plant cells
- Animal and plant reproduction
- Biochemistry
- Career opportunities in sciences
- Cell respiration
- Chemical elements
- Conservation and pollution
- Drugs & narcotics - use, history & hazards
- Electroplating
- Ecology
- Evolution & genetics
- Electrons & electric circuits
- Embryology
- Famous scientists
- Food & Drug Adminis. - history & work of
- Heredity
- How things work
- Identification of birds, flowers, trees, weeds, etc.
- Mental health
- Microscopic organism/microbiology
- Photosynthesis
- Research & standardization
- Science Fair project ideas
- Science stories at pre-school/primary levels.
- Successful research in all sciences
- Tropical fish and acquaria (elementary level)

3. Suggested subject matters for large pictures, charts, etc.

- Air, water, etc. (elementary level)
- Animals, plants, space, weather (elem. level)
- Basic scientific concepts - i.e., differences between solids, liquids, and gases (elementary level)
- Care of teeth, eyes, ears, etc. (without advertisements)
- DNA replication and transcription
- Good engineering & technological posters, foreign and domestic
- Human anatomy/human body
- Landform features
- Levers, machines, energy, and work
- Meiosis
- Molecular models of biological compounds
- Periodic charts of the elements
- Pre-historic animals
- Sky maps or charts on constellations

4. Other suggestions on specific teaching materials

a. Models:

- Realistic plastic models showing atomic structures
- Inexpensive, durable individual construction models of DNA, RNA - ones that students can put together as a learning exercise
- Inexpensive models for biology
- Molecular models for biological compounds
- Cardboard mock-ups of instruments and costly apparatus. Example: Carboard computers
- Models to relate body structure
- Models of all human parts - student sized
- Models of space machinery/space craft (tools and things used in space)
- Optical and light producing models demonstrating color, reflection, refraction, etc.
- Models of organic and inorganic compounds
- Workable models in minature of .....
  (1) machines
  (2) body functions (heart & skeletal systems)
  (3) plastic type plants
  (4) solar system (planets, satellites)

b. Kits:

- Student kits on magnetism; pulleys & gears; etc.
- Project kits to illustrate any biological topics
- Kits of pictures and biographies of famous scientists, both past and present
- Kits of current industrial involv ement
  Example: Bell System kits
- Multi media kits in all elementary science areas
- Pupil kits - class demonstration kits - on basic scientific concepts (grade school level)
- Laboratory equipment kits on air, water, heat, light (elementary level)
- Reusable science kits with materials for discovering and experimenting - basic materials, magnifiers, chemicals, plates, tubing, flasks, etc. (grade school level)
- Individual model kits for making flowers, animals or plants (grade school level)

b. Kits (continued)

- Experiment kits for general science subjects, such as physical and chemical changes, light, sound, heat, weather, energy, magnetism, conquest of space, etc. (grade school)
- Kits of inexpensive materials children can use to do their own experimenting, such as dry cells, wire, balloons, chemicals, animal cages, or instruments for building animal cages, incubators, simple machines, nature trails, etc. (grade school)
- Kits - more with a large amount of items (30 - 35) contained of the same object - examples: magnets, balances, tape measures, compasses, and other items which are used safely by most students (grade school)

c. Miscellanous teaching materials:

- Simplified materials for 'simple machines' in physics
- Computer time and instruction - workshops for selected students and teachers
- A good student science dictionary with pronunciation and meanings
- Rock and/or mineral samples
- Puzzles on biological terminology
- Guest speakers/lecturers - from universities and industry - well-illustrated lectures for classes in physical science and biology
- Material of all kinds on oceanography
- Lab materials for 'living things' (elementary biology)
- Pre-school materials - toys with science connotation
- Nuclear materials/materials on atomic energy
- Packaged assortments of plastic tubes and caps for water play (grade school)
- Inexpensive or free equipment to use in working with the metric system for elementary students - i.e., liter measuring device, graduated cylinders, meter stick
- Colorful material to teach conservation (elem. level)
- Inexpensive, simple equipment available in classroom amounts. For instance, cheap thermometers, rulers, lenses, plant growing containers, pendulum bobs, etc.

c. Miscellenous teaching materials (continued)

- Simply explained materials on space travel, air, water, animals, study of man (elementary level)
- Free, inexpensive 'good' magnifying glasses
- A tape recording to accompany a picture book so children wouldn't have to read for himself yet could replay tapes of necessary subjects: volcanoes, earthquakes, mountain formation; electric circuits; air and water pollution; geological formations; etc.
- You build, develop, improve' type projects, such as the excellent Mini-Scope simple lens microscope.
- A center where a class could go for a school week - live there - have different programs
- Materials that would guide students to observe and record observations of 'nature's lab'
  Example: McGraw Hill's program, "Where is the moon?"
- Industry should make available to schools any surplus instrumentation for use by the students for (a) class use, (b) project use, (c) club use.
  Examples: outdated pH meters, oscilloscopes, etc. that may be repairable or even 'stripped' or 'cannabolized' for parts in using or making other instruments.
- Materials that students could use on their own to relate classroom act to industrial applications, especially for engineered-oriented students.
- Construction of an instrument for making duplicates from 'masters' that would be easy, non-destructive, and inexpensive enough for individual purchase by instructor.
- In-service workshops which help teachers to see a need or use for aids or teaching materials.
- Consulting services for science teachers on technical and academic problems. Examples: laser technology, theory of operation of a mass spectrograph
- Training material on how to teach on an individual basis (biology) - ways to motivate the slow learner

5. Special problem areas

a. Need for materials directed to low ability pupils

- Materials and courses of study for low ability students are needed. Much of the available material is geared to average and above average groups.
- Booklets of simple vocabulary for slow learners
- There should be more material directed at the average and below average students
- I would like to have inexpensive booklets for my low ability students to supplement their text on ecology, photosynthesis, respiration, embryology, and other topics written at their reading level without being 'babish'
- Materials for the slow learner are direly needed, such as films, film strips, kits, classroom project sets, and games/puzzles

b. High cost of visual aid equipment

- Thousands of small school systems cannot afford 16mm motion pictures. Any lending system of films where the effective teaching of science subject matter takes place would be of tremendous assistance.
- High cost of education and science equipment. Science supply catalogs charge extremely high prices.
- Just purchased set of film loops but am very disturbed with high prices of them. Need more film loops at cheaper prices.

c. Some materials not adaptable for classroom situation

- Projects, games and puzzles are excellent for individual student help but usually of little value in the classroom situation.

d. Need for single concept approach

- Needed are films, filmstrips, and transparencies concerning a single basic scientific principle rather than broad all inclusive content, with industrial and commercial emphasis.
- A vast number of single concept topics could be used in biology, earth science, math, physics, and chemistry.
- Books and audio visual aids should be of a single concept...not try to jam all reading levels and subject levels into one book.
- Single concept films on given areas would be very helpful, especially if they were in a loop cartridge which the students could use by themselves.

e. Other:

- Booklets and other visual aids must be brought up to date, or as close as possible to what is being done in science. Too many of the films we have seem still too far behind the modern time.
- Industries which furnish science instructional materials ought to consult the people who use them. Too often these materials are produced and found not to be useful to the science teacher.
- Too frequently elementary teachers are 'helped' by persons who know little or nothing about elementary school teachers and/or children.
- Too many industry materials are slanted to company use, or so specialized as to be unfit for classroom use.
- If a multi media approach is used, the items should be geared for specific levels of learners so that one one source is for the conceptual oriented learner while another is for the physically concrete oriented ones.
- I want to take the students on tours but am refused by industry because 120 is too many.
- Critical need of earth science-related industries to permit field trips and tours. Ohio industries are extremely reluctant about permitting tours of salt mines, gypsum and limestone quarrels, etc.
- Most visiting lecturers cannot talk to kids.
- There is a tremendous amount of material available. It is difficult to evaluate because much of it is poor, some good, some inadequate, etc.
- I have a hard time finding out who and what is available. This relates to field trips, plant and lab tours.
- Often have wished for a quantity good advertising pages from magazines that show science related scenes or information - something that we could get for a very small fee and have it retain a minimum of advertising. Example: Parke-Davis History of Medicine or Pharmacy.

SUGGESTIONS ON PHYSICAL FACTORS THAT WOULD BE HELPFUL IN USE OF VISUAL MATERIALS

Group: Grade Schools

Physical factor	Number of mentionings
1. Classroom/Wall Charts and Posters:	
a. Size -	
. Large - for classroom size	4
. Poster-sized	2
. Specific dimensions:	
- 18" x 24" to 26"	2
- 12" to 24" x 96"	1
- 24" x 28"	1
- 24" x 36"	3
- 28" x 40"	1
- 36" x 54"	1
- 48" x 72"	1
b. Printing - large	3
c. Color - colorful/full of color/ bright colors	10
d. Durable/heavy type paper	2
e. Simple language/vocabulary	2
f. Large striking concept captions	1
2. Bulletin Board Materials (Pictures, Charts)	
a. Size -	
. Large - suitable for bulletin bd.	7
. Magazine size	1
. Specific dimensions:	
- 8" x 10"/12"	8
- 9" x 12"	1
- 12" x 18"	1
b. Printing - large	4
c. Color - Colorful/lots of color/bright colors	11
Natural/true to life color ...	2

		Number of mentionings
d.	Fully illustrated	2
e.	Durable material	3
f.	Minimum wording	1
g.	Not too many ideas on any one item; uncomplicated concepts	4

3. Other Visual Materials

a. Booklets/books

- Comic type booklets should not have such garish colors.
- Paperback size for books, color and clear illustration needed for elementary level.
- Colored booklets of from 20-30 pages. Some illustrations, but mostly explanations or experiments. Questions at the end of each booklet, covering the main ideas, are very helpful.

b. Films/filmstrips

- Sturdy, colorful, well illustrated - not too wordy, up-to-date films.
- Any format that lends itself to possible overhead transparency projection (clay-based paper, etc) would help.

c. Other:

- Demonstrations to be of large enough size for a class of 30 students to see it.
- "Big Look" at "Little Things" for studying insects, etc, which are alive. Example: ant farm made with some sort of magnifying glass.

4. Miscellaneous Comments (Type of Material Not Specified)

- Simplicity, readable, large printing
- Format clear, precise, colored
- I prefer short honest well-illustrated with clear photo materials with a starting point for a deep involvement suggested and some helpful hints on how to get started.

- We'll use what we can get but consideration should be given to simple, uncluttered, single concept presentation of idea.
- Bright colors and lots of pictures important. TV has conditioned children to shy away from reading. Posters helpful. Small take-home booklets often wasted unless put on a "borrow-from-classroom" basis.
- More free and low cost "hardware" for children to work with rather than just printed materials.
- I would suggest few limitations; only that the materials be made to fit the purpose (e.g. desk work, class demonstration, assembly presentation)
- There is a desperate need for materials which can help stimulate "desire to READ" in ghetto areas. Home kits (low cost)
- Controlled vocabulary in pamphlets for elementary reading ability. More graphs, charts,
- Material should not cover too much information... should be geared to grade level; colorful and well-illustrated with diagrams, graphs, interesting pictures.
- I would like to see high interest, low reading ability, in science. It is one area where underachievers would want to read - stressing scientific method and approach and facts and experiments.
- Primary children like illustrations that are large, simple in design and lines; boldly colored but not overcolored (distracting, then).
- Individual concepts should be simply but adequately presented on full page preferably. Questions included for further study or having curiosity aroused by other means.
- All printed material should be of highest presentation quality... as good as Volkswagen advertising BUT I don't need print, I need equipment.
- Language to be simple - non-scientific if possible.
- Material with little or no text and all pictures (color) is most useful.
- Colorful and large material is useful in the elementary schools - especially in the primary grades.
- Material at the 6th grade level must be inviting in color, easy to handle for them to get involved.
- Color is more attractive to the child. Relatively simple vocabulary is important as well.

SUGGESTIONS ON PHYSICAL FACTORS THAT WOULD BE HELPFUL IN USE OF VISUAL MATERIALS

Group: High Schools

Physical factor	Number of mentionings
1. Classroom/Wall Charts and Posters:	
a. Size -	
. Wall chart sized; large enough to be seen/read from back of classroom	31
. Can be seen/read at distance of:	
- At least 20'	2
- 25' - 30'	5
- 30' - 35'	1
. Specific dimensions:	
- 18" x 24"	1
- 20" x 30"	1
- 24" x 36"	3
- 24" x 24"	1
- 24" x 48"	1
- 30" x 42"	1
- 36" x 36"	1
- 36" x 48"	2
- 40" x 40"	1
b. Printing - large print/type/block letters; bold print....	8
c. Color - colorful; multi colored; color desirable/preferred .	28
d. Wording - simple wording/language..	3
e. Clearly labeled; identifying componenets	5

	Number of mentionings
2. Bulletin Board Materials (Pictures, Charts)	
a. Size -	
. Large for bulletin board use	13
. Specific dimensions:	
- 8" x 10"	2
- 8" x 11"	2
- 8" x 12"	2
- 8" x 14"	1
- 9" x 12"	1
- 12" x 15"	1
- 12" x 18"	2
- 12" x 24"	2
- 14" x 16"	1
- 15" x 20"	1
. File-door/file drawer size	2
b. Printing - legible printing; large lettering	6
c. Color - colored; multi colored	20
d. Other:	
. Simplified; uncomplicated	4
. Labeled clearly	1
. Strong enough for handling and reuse	1
. Eye-catching/appealing/attract attention	3
3. Materials for Individual Students	
a. Size -	
. Standard notebook size (3-hole)	8
. 8½" x 11"	7
. Small enough to pass around	1
b. Printing - a little larger than used in most textbooks	1
c. Color - color-keyed; bright colors; color illustrated	11
d. Other:	
. Available in quantity of average class size (30 to 40)	4
. Can be used in 'ditto' masters; 'ditto' reproduction	4
. Durable to withstand passing around..	1

4. Other Visual Materials

a. Books/booklets/pamphlets

- Comic-book format as used by GE series has been well accepted by students
- Many New York City students have reading problems (foreign-born, etc). More colorful illustrations and simple language in books would be helpful in aiding their reading and in mctivation of classes.
- Booklets of normal text size, or notebook size helpful.
- Small one-subject booklets in a variety of scientific fields are useful as supplementary reading for interested students.
- File-size paperback - all the color possible and single concept.
- Need colorful comic books for slow readers in areas pertaining to health, drugs, smoking, narcotics, proper use of medicines, dangers of mixing chemicals, etc.
- Lab books which have short enough lab projects for 30-40 minute lab set-ups.
- Lab manuals - in smaller, 'adjustable' units rather than large manuals.
- The color printing makes booklets more interesting. Some are printed on too narrow paper, making the booklet easy to lose and hard to store.

b. Films/film strips/transparencies

- Color and animation in film.
  Overlays on overhead transparencies.
- Kids hate film strips, etc. You've got to have top quality material that fits into a program smoothly, or they'll think you're using the stuff to keep from doing your job.
- Overhead projectuals are best if <u>something happens</u> on them; e.g. moving parts, useful overlays, etc.

c. Models

- Uncomplicated models teaching one concept.
- Large simple charts and models which can be seen when one sits in back of the classroom. Labels and other printing should be large.

d. Other:

- Erasable color chalk.
- Electric apparatus should be put into kit form to conserve storage space and companies should furnish instruction manual for lab exercises.
- Low cost star maps indicating current location on a monthly calendar arrangement. Large map of moon.

5. Miscellaneous Comments
(Type of visual material not specified)

- Develop posters that will develop reasoning capabilities not just informative dialogues.
- Companies should make themselves familiar with the method of presentation in current high school texts.
- Most materials today are not meaningful and too commercial.
- Most free printed material is too much material and too many words. "Let's get away from cramming".
- Storage is a problem.
- Free and low cost, but please - durable!
- Each piece of material should develop only one concept. Many times posters are too crammed to be meaningful because the words are too small.
- One should be able to fold the materials so they could be brought to the various classrooms and auditoria wherein they are used.
- Objects must be collapsible to compact items for ease of storage if desired. I am in dire need of more storage space.
- Portable for storage care, normal print, color.
- Ease of storing for reuse is importnat in my estimation.
- Clear and colorful for easy interpretation, extrapolation, and intrapolation.
- Reusable, occupay in storage space, honest, imaginative, must be in color if that is authentic.
- Simple concept applicable to industry without too much "commercial".

AVAILABILITY OF AUDIO-VISUAL EQUIPMENT

Equipment	% reporting availability
. Overhead projector	97%
. 16mm projector	95
. Audio tape recorder	86
. 8mm projector	41
. Video tape recorder	27
Other: (based on open-end)	
. Film strip projector...	28
. Opaque projector.....	20
. Slide projector	14
. Record players	11
. Film loop projector ...	7
. Microprojector	5

Base: Total sample (521)

AVAILABILITY OF AUDIO-VISUAL EQUIPMENT

Equipment	No. reporting availability Total	Grade school	High school	Other
. 8mm projector	212 (4)	44	151	17
. 16mm projector	497 (5)	117	355	25
. Overhead projector ...	506 (7)	122	359	25
. Audio tape recorder ..	446 (19)	113	310	23
. Video tape recorder ..	141 (48)	29	101	11
. Other	270	77	183	10
Film strip projector	146	38	102	6
Opaque projector	105	39	60	6
Slide projector	74	10	59	5
Record players	56	19	36	1
Film loop projector..	37	7	29	1
Micro projector	27	10	15	2
TV sets/closed circuit	14	5	8	1
Bioscope	11	5	6	-
Cameras (still/movie)	7	1	6	-
Photocopier	6	3	3	-
Listening stations...	6	5	1	-
Models	5	3	2	-
Microscopes	5	2	3	-
Viewers	2	1	1	-
Laminating machine ..	1	-	1	-
Rayscope	1	-	1	-
Transparency maker ..	1	-	1	-
Multi-media kit.....	1	-	1	-
Programmed learning device	1	1	-	-

Question h - Please check availability of audio-visual equipment in your teaching situation including your familiarity with the equipment.

Note: Figures in ( ) denote the number who reported unfamiliarity with operation of the specified equipment.

COMMENTS ON EASE OR DIFFICULTIES IN WORKING WITH VARIOUS AUDIO-AIDS

	No. of mentionings
1. NO PROBLEMS in using/operating audio-aids; easy to use/operate; trouble free	166
2. PROBLEMS:	
a. Not enough equipment to go around; limited availability; insufficient no. of pieces of equipment available	33
b. Equipment not available when needed; difficulty in scheduling; equipment in use when wanted	28
c. Difficulty in obtaining films/ film strips when needed; films not available when needed	24
d. Classrooms not adapted/designed for audio-aids; inadequate room facilities - room arrangements poor for viewing and hearing aids; difficulty in darkening classrooms adequately for film showings	19
e. Budgetary limitation/restriction on purchase of new equipment; relatively high cost of audio equipment	15
f. Lack of time to prepare adequate visual aids for class use (making tapes and transparencies)	9
g. Old films; antiquated models - "clumsy" to work with	7
h. Difficulty in moving audio equipment - too heavy/cumbersome to carry around	4
i. Some films are not geared to pupils of recommended age groups; some vocabulary and concepts not appropriate for recommended age groups/ grade levels	4
j. Slow/uncertain service on rental films	4
k. Equipment not always properly maintained and in good working condition; breaks down often, in poor working order	3
l. Inadequate storing facilities for equipment; lack of space to keep set up.....	2

3. DIFFICULTIES WITH USE OF SPECIFIC AUDIO AIDS

- The video tape recorder is too cumbersome and not mobile enough for classroom purposes.
- Video tape recorder especially is difficult since the TV programs do not coincide with times of day or times of year in which material is being covered.
- Video taping requires a great deal of time in preparation.

- The overhead projector is the most difficult to use due to the size and shape of the classroom.
- The overhead's only disadvantage is looking into the bright light under materials causes sore eyes.
- Glare from overhead is blinding, and the advantage of facing audience is lost.
- The students complain about overhead projectors and the eye glare (plus that they get bored with it in many classes).

- Opaque projector is too big and heavy to move easily.
- Overhead projector - too heavy to carry around.
- Opaque projector - very cumbersome.
- Opaque projectors should be redesigned to give higher intensity light and less heat. Present equipment is too dim and the heat from the projectors damages photos, books, etc.
- Have not found an easily handled opaque projector.

- Bioscopes are basically very good but the image is too small for practical use.

COMMENTS ON BUSINESS/INDUSTRY SPONSORED FREE AND LOW COST MATERIALS - AS RELATED TO RESPONDENT'S TEACHING SITUATION

(Question j)

	Page
1. Favorable comments - general	33
2. Specific materials found to be helpful/useful	34
3. Negative comments	36
4. Suggestions for improving business/industry sponsored free and low cost materials.....	38

COMMENTS ON BUSINESS/INDUSTRY SPONSORED FREE AND LOW-COST MATERIALS - AS RELATED TO RESPONDENT'S TEACHING SITUATION

1. Favorable Comments - General

- Greatly appreciate the material business and industry make available to us.
- Have found the ones I used to be quite good.
- Usually they are very good to use when we can get them.
- These materials have proven as valuable teaching aids.
- Appreciate the interest that industry has shown through free films, TV shows, etc.
- I have been grateful for anything we have gotten.
- Industry representatives are most generous in the teaching material and I am perpetually amazed at what is available.
- I believe that business/industry sponsored materials are most helpful in my teaching experience - esp. if they are free from too much advertising and are clear and meaningful to the group I am teaching.
- I have used many business sponsored materials with various units...and found them to be very useful.
- The materials available are of tremendous value when used correctly. I appreciate them very much.
- Of the material I have sent for from business and industry, it has been satisfactory.
- Many are good, a few are commercials.
- Industry sponsored sound films, charts, photographs, etc. are useful to impart information and to stimulate interest.
- Learned from many companies of free material that can be used in the classroom.... These materials have proven as valuable teaching aids.

2. Specific Materials Found To Be Helpful/Useful

(Listed alphabetically by source)

Source	No. of mention.	Specific material
. American Cancer Society	2	
. American Dairy Council ...	3	Materials on care of animals in the classroom, tests with milk
. American Heart Assn	2	Films, booklets
. American Oil Company	2	Booklets on petroleum
. American Petroleum Inst...	2	Booklets
. Arizona Cotton Assn.....	1	
. Atomic Energy Comm.....	1	
. Bell Telephone System	21	TV Science Films Science kits and aids
. Carolina Surgical Supply..	1	
. Chemical Mfg Assn	1	
. Coca Cola	3	Science kit
. Denver Museum of Natural History	1	
. East Ohio Gas Co.....	1	Films, posters, pamphlets
. Eli Lilly Co	2	Booklets
. Fisher Scientific Co.....	1	
. Ford Motor Co	1	Film on National Parks
. Florida phosphate industy.	1	Maps and test kits
. General Electric	6	Bulletins; comic-type booklets; animated films; posters relating to application of scientific developments
. General Motors	2	Booklets on automobile and auto related technology
. Illinois Bell Telephone ..	1	Films
. Iowa petroleum industry...	1	
. Lederle	2	Lab exercises and related materials
. 3M	2	Film "How Life Began"
. Merck	1	Periodic tables
. Medusa Cement	1	Samples of marble, gypsum & limestone

Source	#	Specific material
. National Tuberculosis Assn	2	Films, booklets
. NASA	6	Films, booklets
. National Science Teachers Association.....	1	
. NW Bell Telephone	1	
. NE Bell Telephone	1	
. NY State Museum	1	
. NY State Health Dept.....	1	Films to supplement biology lessons
. No. Carolina Supply	1	Booklets
. Ohio Bell Telephone	1	Films
. Portland Cement	1	
. Pzifer Labs	1	Career opportunity booklets
. Plough Corp	1	Plant tour
. Shell Oil Co.....	12	Booklet on rock & mineral collection; films (e.g. "Prospecting for oil", "A light in nature"
. Standard Oil Company	2	Bulletins
. Standard Oil of California	1	Films
. Standard Oil of Ohio	1	Films
. St. Regis Paper	2	Posters
. Sun Oil Co	2	Workshops for elem. sc. teachers Lecture: "Magic Barrel"
. Shenango Valley Water Co..	1	Booklets on water uses
. Sinclair Oil Co.....	1	Pictures of dinosaurs
. Spreckels Sugar	1	
. Silver Buridect	1	Bulletin
. Turtox	2	Leaflets on biological subjects
. U.S. Bureau of Mines	2	Film "Petrified River"
. U.S. Dept of Agriculture..	1	
. U.S. Coast & Geodetic Survey	1	
. U.S. Steel	1	Film "Research in Steel"
. Union Pacific	1	Calendar posters
. Union Carbide	3	TV film "21st Century"
. Ward's	2	Curriculum aids
. Welch	1	Periodic tables

	No. of mention.
3. Negative Comments	
a. Too many industry-sponsored materials are too commercialized/overly commercialized	20
. Many are merely advertisements or promotional materials; still too much advertising in many of the free material.	
b. Some teachers are not aware of free and low cost industry material available	17
. Teachers are not always aware of sources for free and inexpensive materials.	
. No way of knowing what is available.	
c. Some materials are not geared to appropriate grade levels	10
. Most of coomercial free and low cost materials are not suitable for primary grades.	
. Most material is geared to the older child and has to be remade by the teacher so as to better fit the age and development of the child she is teaching.	
d. Too many are not suitable quality for classroom use; so many are low quality	7
. Sometimes a bunch of junk.	
. Disappointed in the quality of materials used.	
. (Industry) continues to turn out mountains of unusable materials.	
e. Industry materials are too often "not available" or "out of stock" when needed ...	7
. Cannot always get them when you want them.	
. Waiting time is so long that it makes ordering impractical.	
f. Industry is often reticent in assisting small town schools/private schools	3
. We are a private school and are often overlooked in these fields.	
. Very few seem to be available to small town schools.	
g. Company teaching aids for sale are too high; charges on rental films are high.....	2

h. Other:

- Materials are too general and not specific in content to be of use in classroom.
- Many company films are "very old", "dated"
- Many industry materials are too poorly organized.
- Materials are often unclear, too complicated.
- Materials are not offered in quantity for class use.
- Many good films have restrictions on the area of country which borrow them.
- Many small pamphets are not suitable for class use due to size and fine prints.
- A large number of pamphlet materials seem to be written:
  - to impress a supervisor
  - to kill time
  - by non-teacher oriented personnel.
- Problems are not so much with "available material" as with student scheduling and control of printed matter, and other items, to permit access by students at convenient times.
- Bell Telephone refused to supply their science teaching kits to our school due to our not being under Bell's area of service. This occurred even though I spent a night at their orientation demonstrations.
- Too frequently these materials are developed by someone who has a very limited understanding of children, and learning at the elementary level. Thus, the materials are of very little use to teachers.
- Movies available very seldom teach one or two concepts but seem aidmed at a broad audience and try to cover too much.
- We need more science students and business/ industry could help enrich the courses.... So far they've held us back by increasing the costs on everything.
- Business and industry should realize that most high school teachers have 160 to 170 students, not 40 students. Any material they want to give is usually for only 40 students.

4. Suggestions for Improving Business/Industry Sponsored Free and Low-Cost Materials

	No.
a. Business/industry should offer more free and low-cost materials easily available to schools/educators	20
b. Business/industry should make known the free materials available to schools	18

c. Other:

- More materials should be geared to special groups. Example: the slower (low-ability) students.
- Interested industry might provide summer employment for selected teachers to develop useful materials.
- Busines/industry should hold in every school district an annual teacher business/industry get-together to determine needs that are specific to that district.
- Industry should sponsor teacher workshops and in-service training sessions.
- Concrete objects, people to do demonstrations, resource speakers, etc. would be very valuable with the low socio-economic class children in my situation. Guided tours sponsored by local industries would also be valuable.
- I would like to give students more exposure to what goes on in the field of industry. They should have an opportunity to become acquainted with careers in business and industry.
- Would like to see older students invited in to study within the walls of labs, etc. (rather than just in school)
- Mfrs. of audio visual equipment could provide a useful service by providing extensive in-service training for classroom teachers in the use and care of the manufactured products each company supplies.
- We are in bad need of any lab or visual equipment that can help illustrate the abstractness we are faced with. These kids are not grasping very much because they can't see it. Therefore, any help from anyone is a blessing.

- Accurate and good quality topical material is needed. This should be of varied levels with direct descriptions and attractive illustrations.
- Could use speakers from research to aid as an impetus to learning. Could also use basic lab equipment sometimes discarded for industrial use in research (possibly being obsolete) which is badly needed for more sophisticated experiments of "Honor Students".
- Research "notes" (newsletters) and opportunities should be available for both faculty and students similar to notices from local TV stations regarding scientific programs.
- I would appreciate and encourage any and all cooperation between science and industry. These students will be working for industry as are their parents already and they pay the bill for a lot of education -- industry council setup in every community or county to improve the cooperation and understanding between them.
- In ghetto areas we can use large quantities of reading material which children can take home and keep. We can't get them in sufficient quantities - and - we don't get enough money to buy them.
- Items I have found a need for and difficult to find inexpensively are - meter sticks, similar to yardsticks used as advertisements by some firms; small thermometers, small compasses (about the size of nickel). These items need be distributed in packages of 25 or 30, since each child needs his own hardware to experiment with.

MOST VALUABLE GUIDES TO THE AVAILABILITY OF
FREE AND LOW COST TEACHING MATERIALS

Guide	No. of mentionings			
	Total sample	Grade school	High school	Other
Professional journals, magazines, publications	344	105	222	17
Commercial sources, catalogs, advertisements for commercial sources, etc.....	231	33	186	12
Professional society or association newswletters, etc.....	178	42	128	8
Governement publications.....	142	32	107	3
Printed bibliographies (books)	65	19	42	4
Trade associations or trade group	30	7	23	-
Other	36	10	23	3
• Other teachers; colleages	9	5	3	1
• Local organizations	2	1	1	-
• Book fairs	2	2	-	-
• Workshops & institutes	2	2	-	-
• Professional meetings	1	-	1	-
• Free audio-visual aids	1	-	1	-
• Dispays at professional conventions	1	-	1	-
• Own bibliographies	1	-	1	-
• Special TV programs aimed at schools & teachers	1	-	1	-
• Textbooks	1	1	-	-
• General magazines	1	1	-	-

Question k. Please check your most valuable guide(s) to the availability of free and low cost teaching materials.

If possible, please state title(s) or name(s) of specific journal, publication or other sources.

TITLES OF SPECIFIC JOURNALS, PUBLICATIONS AND OTHER SOURCES CONSIDERED AS 'MOST VALUABLE GUIDES'

Title	No. of mentionings			
	Total sample	Grade school	High school	Other
1. Most Frequently Mentioned Titles of Journals, Etc. (5 or more mentionings)				
. Science and Children (NSTA)	61	40	15	6
. Science Teacher	51	4	43	4
. NEA Journal	(31	11	17	3
. NEA publications	(8	4	4	-
. Instructor	30	23	3	4
. Educator's Guide to Free Teaching Aids/Science Materials (EPS)	25	8	16	1
. Scientific American	21	-	21	-
. Grade Teacher	21	15	3	3
. Chemistry	19	-	18	1
. American Biology Teacher ...	18	-	18	-
. NSTA Journal/Bulletin	14	5	9	-
. NSTA publications	13	4	8	1
. Science News/Newsletter.....	12	-	12	-
. Physics Teacher	11	-	11	-
. Nature and Science	11	8	2	1
. Today's Education	9	2	7	-
. Journal of Chem. Education	8	-	8	-
. Science World.....	8	-	7	1
. Science	6	2	4	-
. National Wildlife Magazine..	5	3	2	-
2. Other Titles of Journals, Publications, Etc. (listed alphabetically)				
. AAAS Newsletter	1	1	-	-
. ABT publications	1	-	1	-
. ACS publications	1	-	1	-
. AGI publications	1	-	1	-
. Am Childhood Education Jnl	3	3	-	-
. Am Educ pubications	4	2	2	-
. Am Journal of Physics	1	-	1	-
. Am Scientist	1	1	-	-
. Arithmetic Teacher	2	1	1	-
. Audio-Visual Journal	1	-	-	1
. Audubon Society publications	2	2	-	-

Title	Total sample	Grade school	High school	Other
. CEA Magazine	1	1	-	-
. CTA Journal	3	1	2	-
. C & E News	2	-	2	-
. Catholic School Journal ...	2	1	1	-
. Chemical Journal	1	-	1	-
. Chemical Week	1	-	1	-
. Conservation News Bulletin	1	1	-	-
. Cornell Science Bulletin ..	1	1	-	-
. Curious Naturalist	1	1	-	-
. Current Science	4	-	4	-
. ESCP Newsletter	1	-	1	-
. ESCP materials	2	-	2	-
. ESS Newsletter	1	1	-	-
. ESS Teacher Guidebooks.....	1	1	-	-
. EPS publications	3	-	2	1
. Education	1	-	1	-
. Elementary Science	2	1	1	-
. FHESP Newsletter	1	-	1	-
. Focus	1	-	1	-
. Geotimes	2	-	2	-
. IEA Journal	2	2	-	-
. IPS Newsletter	1	-	1	-
. ISEA Magazine	1	1	-	-
. Information Report - Animal Welfare Institute	1	-	1	-
. Journal of Geological Educ.	2	-	2	-
. Journal of Quality Control	1	-	1	-
. KEA Journal	1	-	-	1
. MEA Journal	1	-	1	-
. Mathematics Teacher	1	-	1	-
. Mathematics Teaching Aid..	1	-	1	-
. NABT Journal	1	-	1	-
. NABT publications	1	-	1	-
. NAYCE Magazine	1	1	-	-
. National Geographic	1	-	1	-
. Natural History.....	1	1	-	-
. National Biology	1	-	1	-
. PSEA Magazine	1	-	1	-
. PSTA Newsletter	1	1	-	-
. Petroleum Refiner	1	-	1	-
. Physics Today	3	-	3	-
. Popular Mechanics	3	-	1	2
. Popular Science	2	-	1	1

Title	Total sample	Grade school	High school	Other
• Ranger Rich	3	3	-	-
• Scholastic publications ..	3	1	1	1
• Scholastic Teacher	2	-	2	-
• School Management	1	1	-	-
• Science Digest	2	-	1	1
• Science Education	2	-	-	2
• Science Workshop	2	-	2	-
• Sky and Telescope	1	-	1	-
• STA Journal/publications ..	2	2	-	-
• Teacher's Guide to Films & Inexpensive Materials....	2	1	1	-
• Technology Week	1	-	1	-
• Turtox's Newsletter	3	-	3	-
• WEM Newsletter	1	-	1	-
• Ward's Newsletter	4	1	3	-
• Weatherwise	1	-	1	-
• WIMSA Newsletter	1	1	-	-
• Young Children	1	1	-	-
3. State/Local Teachers Assn. Newsletters/Journals, Etc.				
• Arizona Teacher & Newsl'tr	1	-	1	-
• Azusa Unified School Dist. Curric. Guide	1	1	-	1
• Arkansas State Dept of Education Film Cat....	1	-	1	-
• Arkansas Educ. publication Newslink	1	-	1	-
• Indiana Teacher	1	1	-	-
• Illinois Science Newsletter	2	-	2	-
• KATS Newsletter ..... (Kans Assn of Teachers of Science)	1	-	1	-
• Kansas State Teachers Jnl	1	-	1	-
• Kansas Teacher	1	-	1	-
• Mass. Teacher Magazine ...	3	1	2	-
• Michigan Educational Jnl..	1	-	1	-
• Mississippi Educational Jnl	1	-	1	-
• Mo. Coop. College School Program in Physics	1	-	1	-
• Mo. State Teachers Assn Jnl.	1	-	1	-
• NJEA Journal	2	-	2	-
• NYSTA Bulletin	4	-	4	-
• New England Chem. Teacher's Newsletter	1	-	1	-
• Ohio Educ. Assn. Journal...	1	-	1	-
• Oregon Science Teacher Nsltr	1	-	1	-
• Penna. Earth Science Teachers Newsletter	1	-	1	-
• Texas State Teachers Assn..	1	-	1	-

Title	Total sample	Grade school	High school	Other
4. Materials from Business and Industry				
. American Cancer Society	1	-	1	-
. American Heart Asson.....	1	1	-	-
. American Petroleum Inst.	1	1	-	-
. American Sugar Co.....	1	1	-	-
. Bell Telephone	9	1	8	-
. Central Milk Producers Assn of Oklahoma.....	1	1	-	-
. Central Scientific Co....	2	2	-	-
. Eastman Kodak Co	1	-	1	-
. Ford Motor Co.....	1	1	-	-
. General Electric Co.... .	4	1	3	-
. General Motors Corp.....	1	1	-	-
. Oregon Dairy Council	1	-	1	-
. Petroleum industry	1	-	1	-
. Southern Bell Telephone..	1	1	-	-
. Shell Oil Co.....	8	2	6	-
. Union Carbide.....	1	-	1	-
. Welch Lab.....	3	3	-	-
5. U.S. Government Publications; State Govt Materials				
. U.S. Atomic Energy Comm..	4	1	3	-
. U.S. Dept of Interior....	1	1	-	-
. U.S. Fish & Game Comm....	1	-	1	-
. U.S. Forest Service	3	2	1	-
. U S. National Park Service	1	1	-	-
. U.S. Govt publications... (unspecified)	7	-	7	-
. Calif Div. of Mines - Mineral Information Serv.	1	-	1	-
. Maryland State Dept of Health	1	-	1	-
. N.Y. State Health Dept.,.	1	-	1	-

6. Miscellaneous Sources

. Catalogs of biological supplies:
  - Turtox
  - Ward's

. Film catalogs:
  - Arkansas State Dept of Education Film Cat.
  - Montgomery Co. (Md) Library Film Cat.
  - Rockland-Orange Util. Film Cat.
  - Mfg Chemists Assn Film Guide

- Bibilographies; handbooks/sourcebooks:

  - Bibliography of Oceanography
  - Bibliography in Teacher's Guide to Life Science

  - Geological Handbook
  - Chemical Handbook

  - Sourcebook for Biological Sciences
  - Sourcebook for Elementary Science
  - Sourcebook for Biology (Glenbrook)
  - Geology and Earth Sciences Sourcebook

- Materials from museums:

  - Metrop. Detroit Science Review
  - Great Lakes Planetarium Society
  - Mid-Atlantic Planetarium Society
  - Oregon Museum of Science & Industry

- Other.....

  - Peabody College Guide to Free and Inexpensive Learning Materials

  - AAPT Convention exhibits

  - NEA/NSTA regional meetings

  - Life Magazine reprints

  - World Book Encyclopedia

  - Film distributors: Assn Film Distr, Swank Films, Modern Motion Picture Service

APPENDIX

Exhibit A

Postcard alert sent prior to questionnaire mailing

November 8, 1968

Dear Teaching Colleague:

You'll soon be receiving a very significant science teachers opinion survey.

You are being cordially invited to take a part in an important research study designed to determine the type and kind of free and low-cost teaching materials that would make the greatest contribution to your teaching efforts.

The study is being sponsored by a committee of competent and experienced people, all formerly members of the National Science Teachers Association Committee on Evaluation of Business-Industry Sponsored Teaching Aids.

Please be kind enough to give this study your valued professional attention. The survey's return form is addressed and postage paid.

Be on the lookout for it!

Thank you.

Exhibit B Science Teachers Opinion Survey

SCIENCE MATERIALS RESEARCH COMMITTEE

A group of science teachers dedicated to determining many of the free and low-cost teaching materials needed in the nation's science classrooms today!

Box 307, Stoughton, Wis. 53589

This is the survey we wrote you about.

November 18, 1968

Dear Teaching Colleague,

A few minutes of your professional talents and attention contributed to completing this survey will go far in guiding business, industry, government agencies and professional societies towards preparing free and low-cost materials you need in your classroom.

Scientists in education, educators and consultants to science education making up the Science Materials Research Committee are listed below. These people are members of the National Science Teachers Association and formerly served on the association's Committee on Evaluation of Business-Industry Sponsored Teaching Aids.

This study is being sponsored by a small grant from a private not-for-profit foundation interested in assisting the classroom teacher. Results of this survey sent to 2,000 science teachers throughout the country (scientifically sampled from the U. S. Registry - NSTA and the association's elementary school membership list) will be reported and distributed nationally early in 1969.

Thank you sincerely for your early attention and response to this request. This reply form is self-addressed and postage paid.

Professionally yours,

Hubert J. Davis
Science Consultant WHRO-TV
Portsmouth, Va.

Molly S. Geller
Paterson State College
Wayne, N. J.

James R. Irving
Committee Chairman
Stoughton, Wis.

Maurice Levine
Central High School
Pontiac, Mich.

Jerome Metzner
John Jay College
New York, N. Y.

Arden Rose
Honeoye Falls,Central School
Honeoye Falls, N. Y.

Harold Spielman
City College
New York, N. Y.

Carleton P. Stinchfield
Mount Hermon School
Mt. Hermon, Mass.

Arthur D. Strickland
Georgia Southern College
Statesboro, Ga.

SCIENCE TEACHERS OPINION SURVEY

Answering the following questions will help to serve as a guide to busi-
s and industry and governmental agencies and professional societies in pro-
ing you with more effective free and low-cost teaching materials.

Please complete:

a. Geographical location - name city and state in which you teach

_____, _____

Present school population_____ Approximately

b. Grade level - Check One (or more)

( ) Pre-school

( ) Kindergarten

( ) Grade school: (Circle one or more)

1 2 3 4 5 6 7

( ) High school: (Circle one or more)

8 9 10 11 12

( ) College:

_____Undergraduate

_____Graduate

c. Science subject matter area or course you teach -- (Check one or more)

( ) Nursery Schools, Private

( ) Head Start Classes

( ) Kindergarten

( ) Other

Elementary Science

( ) Traditional subject matter

( ) Elementary School Science Advisory & Research Project

( ) American Association for the Advancement of Science - a process Approach

( ) Science Curriculum Improvement Study

( ) Other

Grades 7 -- 8

( ) Traditional subject matter

( ) Intermediate Science Curriculum Study

( ) Introductory Physical Science

( ) Earth Science Curriculum Project

( ) Other

Biology

( ) Traditional

( ) Biological Science Curriculum Study

Blue ( ) Green ( ) Yellow ( )

( ) Other

c. continued.....

Chemistry

( ) Traditional

( ) Chemical Bond Approach

( ) Chemical Education Material Study

( ) Other

Physics

( ) Traditional

( ) Harvard Project Physics

( ) Physical Science Study Committee

( ) Engineering Concepts Curriculum Projec

( ) Other

( ) Agricultural Sciences

College Undergraduate

( ) _____

( ) _____

College Graduate

( ) _____

( ) _____

d. Please note the availability of business and industry free and inexpensive teaching materials for each of the science subject fields or course(s) you teach.

Course	Availability of materials (check one) Adequate	Inadequate	Non-existent
_____	( )	( )	( )
_____	( )	( )	( )
_____	( )	( )	( )
_____	( )	( )	( )
_____	( )	( )	( )

e. Possible Business/Industry Contributions to Science Teaching

Please evaluate as many of the following items as possible in terms of your science teaching interests in them.

Item	Critical need	Useful	Of doubtful use	Of no use
1. Booklets----------	( )	( )	( )	( )
2. Pictures----------	( )	( )	( )	( )
3. Films (Motion Pictures) ( ) 16mm--- ( ) 8mm closed loop	( )	( )	( )	( )
4. Video Tapes----------	( )	( )	( )	( )
5. Film Strips----------	( )	( )	( )	( )
6. Transparencies----------	( )	( )	( )	( )
7. Audio Aids (Records, tapes)---------- Exhibits (Permanent ( ) Loan ( ) i.e. space science materials)	( )	( )	( )	( )
8. Books (Enrichment mat'ls--not texts------ i.e. student dictionary of science terms)	( )	( )	( )	( )
9. Kits containing science toys, graded------ (i.e. basic rocks and minerals)	( )	( )	( )	( )
0. Models (ear, eye, etc.)----------	( )	( )	( )	( )
1. Speakers (Visiting scientists)----------	( )	( )	( )	( )
2. Demonstration Programs (suitable for------- school assemblies, etc.)	( )	( )	( )	( )
3. Library Loan Items (Suitable Packaged)------	( )	( )	( )	( )
4. Classroom project sets----------	( )	( )	( )	( )
5. Give-aways to individual students----------	( )	( )	( )	( )
6. Games, puzzles which teach some aspect ---- of science	( )	( )	( )	( )
7. TV or radio program with industry-wide--- sponsorship (Please note subject matter	( )	( )	( )	( )
8. Computer Time and instruction----------	( )	( )	( )	( )
9. Non-commercial staff in-service education programs	( )	( )	( )	( )
0. Plant or Laboratory tours or visits------	( )	( )	( )	( )

f. Further important suggestions - please be specific about subjects and formats (films, booklets, etc.) e.g. "an 8 mm loop film on cell mitosis

_____

_____

_____

_____

_____

g. Physical factors

Please list various physical factors pertaining to size, printing, use of color, illustrations, etc., etc., that would be especially helpful to you in using various free and low-cost materials.

_____

_____

_____

_____

_____

h. Please check availability of audio-visual equipment in your teaching situation including your familiarity with the equipment.

Equipment	Available	Not available	Are you familiar with operation of this equipment? Yes	No
( ) 8-mm projector	( )	( )	( )	( )
( ) 16-mm projector	( )	( )	( )	( )
( ) overhead projector	( )	( )	( )	( )
( ) audio tape recorder	( )	( )	( )	( )
( ) video tape recorder	( )	( )	( )	( )
( ) others - list				
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )

i. Remarks: Please comment on ease or difficulties in working with various audio-aids available to you.

_____

_____

_____

j. Comment on any aspect of business/industry sponsored free and low-cost materials as it may relate to your teaching situation.

_____

_____

_____

k. Please check your most valuable guide(s) to the availability of free and low-cost teaching materials.

( ) Professional journals, magazines, publications

( ) Government publications

( ) Professional society or association newsletters, promotionals, etc.

( ) Commercial sources, catalogs, advertisements for commercial sources

( ) Trade associations or trade groups

( ) Printed bibliographies (books)

( ) Other

If possible, please state title(s) or name(s) of specific journal, publication or other sources.

_____

_____

Thank you!

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1st Class Permit No. 142
Stoughton, Wis. 53589

BUSINESS REPLY MAIL No postage necessary if mailed in the U. S.

Postage will be paid by: Science Materials Research Committee

Box 307

Stoughton, Wis. 53589